L 32046-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b) Pf-4 MJW/JD/HW/WB

ACCESSION NR: AR4045221 S/0081/64/000/012/K001/K002

SOURCE: Ref. zh. Khimiya, Abs. 12K12

AUTHOR: Moroz, V. G.

TITLE: Effect of elevated test pressures on the hydrogen stability of steels 20, 25L and 20KhGL

CITED SOURCE: Sb. Vliyaniye vodoroda na sluzhebn. svoystva stali. Irkutsk, 1963, 72-77

TOPIC TAGS: steel pipe, steel plastic deformation, hydrogen stability, steel corrosion, test pressure, recrystallization annealing, steel elasticity / steel 20, steel 25L, steel 20KhGL

TRANSLATION: Investigations into the effect of elevated test pressures and plastic deformation on the hydrogen stability of steels 20, 25L and 20KhGl showed that test pressures which produced only elastic deformation in a tubular sample did not lead to an impairment in the hydrogen stability of the metal when the samples were subsequently kept at an internal H_2 pressure of 600 atm. for 1200-2030 hours at temperatures of 250C for steels 20 and 25L and 300C for steel 20KhGl. Test pressures producing residual deformation of the metal in tubular samples

Card 1/2

L 32046-65

ACCESSION NR: AR4045221

did lead to decreased hydrogen stability. The magnitude of this decrease increased with increasing test pressures and increasing temperature at which the sample was exposed to hydrogen. Recrystallization annealing of tubular samples at 600C for 4 hours after test pressures above 800 atm. completely restored the hydrogen stability of steels 20, 25L and 20KhGl under the same conditions of exposure to hydrogen. N. Popova.

SUB CODE: MM ENCL: 00

Card 2/2

MOROZ, V.G.; STARTSEVA, I.Ye.; POPOV, K.V.

Cast steels for operation at low temperatures. Metalloved. i term. obr. met. no.7:31-35 Jl '64. (MIRA 17:11)

L 42058-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b)/EWA(c) Pf-4 JD/HW

ACCESSION NR: AP5010937 UR/0286/65/000/007/0121/0122

AUTHORS: Moros, V. G.; Zelentsov, P. N. 27 26 B

TITLE: Apparatus for determining the gas permeability of sheet materials at high temperatures. Class 42, No. 169846 14

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 121-122

TOPIC TAGS: sheet material, gas flow, permeability, testing device

ABSTRACT: This Author Certificate presents an apparatus for determining the gas permeability of sheet materials at high temperatures (see Fig. 1 on the Enclosure). The apparatus contains an oven for heating the specimen and two pipes with their ends holding the specimen in the oven. One of these pipes conducts a high pressure gas to the specimen, and the other removes the gas which has passed through the specimen. To simplify the regulation of the hermetic seal on the specimen during the test, the pipes are of different diameters, are coaxially mounted one inside the other, and are provided on one side with caps for holding the specimen and on the other side with bolted flanges. Orig. art. has: 1 figure.

Card 1/3

L 12058-65
ACCESSION NR: AP5010937

ASSOCIATION: Irkutskiy filial gosudarstvennogo nauchno-issledovatel'skogo i proyektnogo instituta neftyanogo mashinostroyeniya (Irkutsk Branch of the State Scientific Research and Design Institute of Petroleum Machine Construction)

SUBMITTED: 25May64 ENCL: 01 SUB CODE: IE

NO REF SOV: 000 OTHER: 000

Card 2/3

L 42058-65

ACCESSION NR: AP5010937 ENCLOSURE: 01

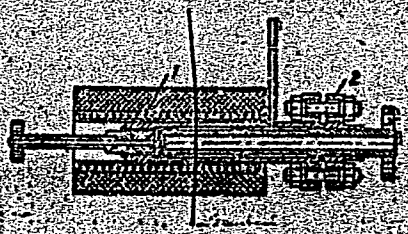


Fig. 1. 1- caps; 2- bolted flanges

Card 3/3

L 01117-66 EWT(m)/EWP(w)/EPF(c)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)
IJP(c) MJW/JD/HW

ACCESSION NR: AP5019655 UR/0369/65/001/003/0304/0307

45
37
B

AUTHOR: Moroz, V. G.; Ivako, L. P. 55

TITLE: Effect of plastic deformation on the subsequent hydrogen resistance of steels

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 3, 1965, 304-307

TOPIC TAGS: plastic deformation, hydrogen resistance, bent pipe, petrochemical piping, cold bending, work hardening, hydrogen brittleness, high pressure pipe, recrystallization annealing, normalization, high temper hardening

ABSTRACT: The need to experimentally investigate the effect of the plastic deformation of metal on its subsequent behavior in hydrogen-containing media at high pressures is dictated by the specific nature of production processes in the petrochemical industry. This is related to the proposals to replace T-pipe and pipe elbows with bent pipe sections in order to simplify and reduce the cost of installing high-pressure piping. The bending of pipe would be performed on the spot, in cold state, without subsequent heat treatment to remove the work hardening; bending angle 90°, radius $5d_{outs}$. The attendant dilatational strain on the convex side of the pipe then reaches 10%. This, however, might involve the danger that the work-hardened metal would become strongly embrittled in the hydrogen atmosphere and thus lead to rupture of the piping. The necessary investigations were accordingly per-

Card 1/2

L 01117-66
ACCESSION NR: AP5019655

formed on rings of EI579 steel and sections of high-pressure pipe of EI579, 20, and 30KhMA steels. The rings were deformed in the laboratory by driving a large-diameter ball through them and thereupon exposing them to a 600 atm hydrogen pressure for 240 hr at 510°C, and tested for continuity of crystalline structure. Findings: deformed metal is more susceptible to hydrogen embrittlement than nondeformed metal. The high-pressure pipe was deformed by bending in cold state, without removing the work hardening, and operated for prolonged periods of time (33,400; 40,340; 46,368 hr) in hydrogen-containing media (82 to 92% H_2) at pressures of 320 to 600 atm and temperatures of 50 to 450°C and higher under industrial conditions. It was found that pipe bent in cold state without removing the work hardening remains operationally reliable and hydrogen-resistant at low working temperatures (50-150°C). At higher working temperatures (up to 450°C, depending on the type of steel), hydrogen resistance of the deformed metal can be assured by means of recrystallization annealing. At still higher working temperatures (above 450°C, depending on the type of steel), the bent pipe sections must be subjected to complete heat treatment -- normalization or high-temper hardening. Orig. art. has: 1 table.

ASSOCIATION: Irkutskiy filial GIPRONEFTEMASh, Angarsk (Irkutsk Affiliate of the GIPRONEFTEMASh)

SUBMITTED: 060ct64 ENCL: 00 SUB CODE: MM

NR REF SOV: 000 OTHER: 000

Card 2/2

L 14418-66 EWP(z)/EWT(m)/EWP(b)/EWA(d)/EWP(t) LJP(c) MJW/JD/WB-
ACC. NR. AP6002123 SOURCE CODE: UR/0369/65/001/006/0717/0719

AUTHOR: Moroz, V. G.; Zelentsov, P. N.; Ivako, L. P.; Saunin, V. I.; Fereferov, Yu. I.

45
44 B

ORG: NII of Petroleum Machinery, Angarsk (NII neftyanogo mashinostroyeniya)

TITLE: Effectiveness of cladding layer of OKh13 steel on sheets of 20K steel against hydrogen corrosion

18,44,55 18 18 27 18,44,55

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 6, 1965, 717-719

TOPIC TAGS: steel, protective coating, hydrogen embrittlement, metal cladding

ABSTRACT: To determine the extent to which a cladding layer of OKh13 steel protects 20K steel from hydrogen corrosion, clad and unclad samples were tested under identical conditions. The hydrogen composition was 92% H_2, 0.10-0.20% CO, 2.0-2.8% CH_4, 5.0-7.0% N_2. A layer of OKh13 steel 1.4-2mm thick was found to provide good corrosion protection at hydrogen pressures of 300, 200, and 100 atm. and temperatures of 400, 450, and 500C. Under these conditions, the unclad steel samples are decarburized. Experiments showed that the decrease in the hydrogen permeability of the clad samples and hence, the desirable protective properties of the cladding layer are due to a hindering of the diffusion of

18

Card 1/2

L 14418-66

ACC. NR.: AP6002123

hydrogen through OKh13 steel. A clad sample of 20K steel kept for 6154 hr. under 100 atm. hydrogen pressure at 500C showed a low hydrogen permeability, the absence of decarburization, and a good plasticity. Orig. art. has: 1 figure and 1 table.

SUB CODE: 11 / SUBM DATE: 17Dec64

hydrogen embrittlement 18

jc

Card 2/2

MOROZ, V.G., inzh.

Bases for methods of calculating the best location for [illegible] preparation plants. Izv. vys. ucheb. zav.; gor. zhur. no.1: 146-154 '65.

1. Khar'kovskiy institut gornogo mashinostroyeniya, avtomatiki i vychislitel'noy tekhniki. Rekomendovana kafedroy obogashcheniya poleznykh iskopayemykh.

MOROZ, V.I., inzh.

Fattening swine with liquid feeds. Mekh. sil'. hosp. 12 no. 5:32 My '61. (MIRA 14:5)

(Swine—Feeding and feeds)

MOROZ, V.I.

SK-2,6 combine harvests corn for grain. Mekh. sil'.hosp.12 no.7:22-23 Jl '61. (MIRA 14:6)

1. Glavnyy spetsialist Gosudarstvennogo nauchno-tekhnicheskogo komiteta Soveta Ministrov USSR.
(Combines (Agricultural machinery))
(Corn (Maize)--Harvesting))

MOROZ, V.I.

Milk tank refrigerators with accumulation of cold. Trakt. i sel'khozmash. 31 no.11:46-47 N '61. (MIRA 14:12)
(Refrigeration and refrigerating machinery)
(Milk--Preservation)

MOROZ, V.I., inzh.

Machinery for the mechanization of livestock farms. Mashinostroenie no.2:98-100 Mr-Ap '62. (MIRA 15:4)

1. Ukrsel'khoztekhnika.

(Farm mechanization)

MOROZ, V.I.

Agricultural machinery at the Leipzig Fair in 1962. Mekh. sil'. hosp. 13 no.8:30-32 Ag '62. (MIRA 15:7)

1. Nachal'nik Upravlinnya mekhanizatsii virobnichikh protsesiv u tvarinnitstvi ob"yednannya "Ukrsil'gosptekhnika".
(Leipzig--Agricultural machinery--Exhibitions)

MOROZ, V. I.

How to reconstruct the grinder IHK-30. Mekh. sil'. hosp. 14 no.1:21-23 Ja '63. (MIRA 16:4)

1. Nachal'nik upravleniya mekhanizatsii proizvodstvennykh protsessov v skotovodstve respublikanskogo ob"yedineniya "Ukrsil'gosptekhnika".

(Ukraine—Feed grinders)

MOROZ, V.I.

From practices in the construction and use of the carrousel-type arrangement for milking parlors. Mekh. sil'. hosp. 14 no.8:22-23 Ag '63. (MIRA 17:1)

1. Nachal'nik Upravleniya mekhanizatsii zhivotnovodstva i vnedreniya elektricheskoy energii Ukrainskogo respublikansko ob"yedineniya "Ukrsil'gosptekhnika".

MOROZ, V.I.

Direct current amplifiers with high transconductance. Prib. i tekh. eksp. no.1:63-66 Jl-Ag '56. (MLRA 10:2)

1. Astrofizicheskiy institut Akademii nauk Kaz.SSR.
(Amplifiers, Electron-tube)

MOROZ, V.I.

Simplified d.c. amplifiers used for photometers with photomultipliers. Prib.i tekh.eksp.no.2:112-115 S-O '56. (MLRA 10:2)

1. Astrofizicheskiy institut AN KazSSR.
(Photometers) (Photoelectron multipliers)

MOROZ, V.I.; KHARITONOV, A.V.

Photoelectric photometry of areas on Mars' surface. Astron.tsirk. no.174:4-6 N '56. (MLRA 10:3)

1. Astrofizicheskiy institut AN KazSSR
(Mars (Planet))

MOROZ, V.I.

Photoelectric photometers for zodiacal light. Astron.zhur. 33 no.5:717-728 S-O '56. (MLRA 9:12)

1. Astrofizicheskiy institut Akademii nauk Kazakhskoy SSR.
(Zodiacal light) (Photometers)

KARIMOV, M.G.; MOROZ, V.I.

Photoelectric recording of the λ 5303 Å emision line of the solar corona by means of a spectrometer and a coronograph in the absence of eclipse. Dokl. AN SSSR 109 no.3:469-471 J1'56. (MIRA 9:10)

1. Astrofizicheskiy institut Akademii nauk Kazakskoy SSR. Predstavleno akademikom V.G. Fesenkovym.
(Sun--Corona) (Spectrum, Solar)

МОРОЗ, V. I. , Master Phys-Math Sci— (diss) "Astrophotometers with electron multipliers." Moscow, 1957, 6 pp, (Moscow State University, im. Lomonosov. State Astronomical Inst im. P. K. Shternberg), 100 copies (KL, No 40, 1957, 90).

MOROZ, V.I.

MORCZ, V.I.

Astronomical photoelectric photometers [with summary in English].
Izv.Astrofiz.inst. AN Kazakh.SSR 5 no.7:50-65 '57. (MIRA 10:7)
(Photometers)

MOROZ, V.I.; KHARITONOV, A.V.

Photoelectric photometry of regions on Mars' surface [with summary in English]. Astron. zhur. 34 no.6:903-920 N-D '57. (MIRA 11:2)

1. Astrofizicheskiy institut AN KazSSR.
(Mars (Planet))

MOROZ, V.I.

Relative photometry of the flow ring during the solar eclipse of February 25, 1952, in Archman. Biul. VAGO no.22:35-37 '58. (MIRA 11:6)

1.Moskovskoye otdeleniye Vsesoyuznogo astronomo-geodezicheskogo obshchestva.

(Stars, Variable)

PHASE I BOOK EXPLOITATION SOV/4693

Nekhozhennymi tropami Vselennoy (Untrodden Paths of the Universe) Moscow, Izd-vo "Pravda," 1959. 63 p. (Series: Biblioteka "Komsomol'skoy pravdy," no. 11) 131,000 copies printed.

Ed.: V. Kukushkin; Tech. Ed.: L. Novikova.

PURPOSE: This popular science booklet is intended for the general reader.

COVERAGE: The booklet contains 14 articles dealing with early and recent efforts and accomplishments in space exploration. Though popular in style, the articles are written by leading Soviet scientists in the field. The contributions of K. E. Tsiolkovskiy to space science are briefly presented. Satellites, space rockets, future space craft, and certain pertinent engineering problems are discussed. No personalities are mentioned. No references are given.

AVAILABLE: Library of Congress

84592

S/169/60/000/008/003/007
A005/A001

3.2400 (1080, 2801, 3201)

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 8, p. 201, # 9910

AUTHORS: Yesipov, V. F., Moroz, V. I.

TITLE: An Artificial Comet

PERIODICAL: Astron. Tsirkulyar, 1959, 15 Okt., No. 205, p. 1

TEXT: Visual and photographic observations were carried out of an artificial comet formed by the clouds of sodium vapors at the flight of the second Soviet cosmic rocket; electronic telescopes were used at Byurakan' and at Stalinabad on September 12, 1959. At Byurakan', 14 photographs were made with 1-sec exposure, at Stalinabad - 13 photographs with 5-sec exposure. The sodium cloud was observed during about 4 min. It emerged in the form of a bright point, the brightness of which increased rapidly. At the end of observations, the cloud had an annular shape the brightness of which decreased with the enlarging diameter. The expansion rate of the cloud was of the order of 2 km/sec, its diameter was 1,200 km at the end of observations. The photographs of the successive stages of widening of the cloud are added. V. P. F

Translator's note: This is the full translation of the original Russian abstract

Card 1/1

SOV/20-126-5-19/60

24 (7)
AUTHOR: Moroz, V. I.

TITLE: The Radiation Spectrum of the Night Sky Within the Range of From 1.2 - 3.4 μ)(Spektr izlucheniya nochnogo neba v oblasti 1.2 - 3.4 μ)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 983 - 986 (USSR)

ABSTRACT: In November and December 1958, the night sky spectrum was taken within the afore-mentioned range at the station of the Institut fiziki atmosfery AN SSSR (Institute of the Physics of the Atmosphere, AS USSR) at Loparskaya (south of Murmansk, $\varphi = 68^{\circ}38'$, $\lambda = 33^{\circ}20'$). This investigation was made by means of a photoelectric spectrometer with a diffraction grating of 300 slits/mm, constructed by the author in his institute (Fig 1). The instrument and its principle of operation are described in the introduction. Observations were made exclusively at a zenith distance $z = 72^{\circ}$ and an azimuth near the north point. The spectrum obtained is represented by figure 2. The sources of the "short-wave" (1.2 - 2.5 μ) range lie in the upper atmosphere, those of the "long-wave" (2.5 - 3.5 μ) range in the troposphere. The results are discussed in detail, especially with respect to

Card 1/2

The Radiation Spectrum of the Night Sky Within the Range of From 1.2 - 3.4 μ SOV/20-126-5-19/69

OH radiation, and compared to results obtained by other authors (I. S. Shklovskiy, N. I. Fedorova). The ratios of intensity and the absolute intensities are listed in two tables and partly compared with the results given in references 3 and 4. The values differ greatly. There are 2 figures, 2 tables, and 7 references, 2 of which are Soviet.

ASSOCIATION: Gosudarstvennyy astronomicheskiy institut im. P. K. Shternberga (State Astronomical Institute imeni P. K. Shternberg)

PRESENTED: February 6, 1959, by V. G. Fesenkov, Academician

SUBMITTED: January 1, 1959

Card 2/2

3.9000

78018
SOV/33-37-1-18/31

AUTHOR: Moroz, V. I.

TITLE: The Infrared Spectrum of the Night Sky Up to 3.5 μ

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol 37, Nr 1, pp 123-130 (USSR)

ABSTRACT: In 1951, I. S. Shklovskiy predicted the existence of strong infrared bands of the OH molecule in the light of the night sky between wave lengths 1.2 and 4.5 μ. In 1953, Jones and Gush registered bands of OH in the range from 1.2 to 2.0 μ. But the range from 2.0 to 3.5 μ has remained unobserved. A special photoelectric photometer equipped with a lead sulfide photoconductive cell and a diffraction grating with 300 lines per mm was designed by the author. The observations were made at the Loparskaya (a branch of the Institute of the Atmospheric Physics of the Academy of Sciences of USSR) between November 23 and December 12, 1958. The point on the sky selected was at a constant zenith distance of 72° in the northern direction.

Card 1/3

The Infrared Spectrum of the Night Sky Up to 3.4 μ

78018
SOV/33-37-1-15/31

The observed spectrum may be divided into two parts: the interval between 1.2 and 2.5 μ comes from the upper atmosphere, and the interval from 2.6 to 3.5 is produced by the thermal radiation of the troposphere. The observed features of the spectrum in the first of these intervals agree well with the results obtained by Gush and Jones and by Harrison and Jones. In the region 2.1-2.5μ, which is relatively free from tropospheric absorption lines, no intense emission bands have been detected. In the second interval (2.6-3.5μ), at 3.2 μ there is a sharply defined band structure which is due to tropospheric vapors of H_2O. The absolute intensity ratios of bands 8 - 5, 3 - 1, 4 - 2, 5 - 3, 9 - 7 of OH were measured and compared with theoretical values. These ratios are in better agreement with the Einstein coefficients calculated by Shklovskiy than with the results of Heaps and Herzberg. A possibility of investigating the bands with Δv = 3 - 1, 4 - 3, 5 - 4, 9 - 8) are discussed. The author

Card 2/3

The Infrared Spectrum of the Night Sky Up to 3.4 μ

78018
SOV/33-37-1-18/31

expresses his thanks to a number of persons who helped him in this work, but mentions especially S. A. Kaufman, I. S. Shklovskiy, V. I. Krasovskiy and V. A. Prokudina. There are 5 figures; - tables; and 14 references, 5 Soviet, 1 German, 2 U.K., 6 U.S. The 5 most recent U.S. references are: H. P. Gush, A. V. Jones, Journal of Atmospherical and Terrestrial Physics, 7, 185 (1955); A. W. Harrison, A. V. Jones, same journal, 11, 192 (1957); D. E. Burch, J. H. Shaw, JOSA, 47, 227 (1957); R. Sloan, J. H. Shaw, D. Williams, JOSA, 45, 455 (1955); J. T. Houghton, T. S. Moss J. P. Chamberlain, Journal of Scientific Instruments, 35, Nr 9, (1958).

ASSOCIATION: Gos. astronomicheskiy in-t im. P. K. Shternberga (Stenberg State Astronomical Institute).

SUBMITTED: April 1, 1959

Card 3/3

9.9000
3.2100
9.6150

83233

S/033/60/037/004/009/012
E032/E314

AUTHORS: Gringauz, K.I., Kurt, V.G., Moroz, V.I. and Shklovskiy, I.S.

TITLE: Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol 37 No 4 pp. 716 - 735

TEXT: The ionized gas and energetic electrons in interplanetary space were investigated with the aid of three-electrode charged-particle traps mounted on three Soviet cosmic rockets. These traps are the result of further development of instruments based on probe methods. Four three-electrode ion traps were mounted on the spherical container carried by the first Soviet cosmic rocket launched in the direction of the Moon on January 2, 1959 Each trap consisted of three hemispherical and concentrically-mounted electrodes whose radii were 60, 22.5 and 20 mm, respectively. The two outer electrodes were fine metal grids, while the third electrode was continuous and served as the collector of the charged particles. The potentials relative to the body of the container

Card 1/9

83233
S/033/60/037/04/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

were as follows: collector 90 V; intermediate grid g_1 - 200 V; the outer grid g_2 + 10 V and 0 V in the case of two of the four traps. The potential of the outer grids of the other two traps was +15 V and their collectors were connected together. The general arrangement of electrodes in these three-electrode ion traps is indicated in Fig. 1. The first grid (g_1) served to suppress the photocurrent from the collector produced under the action of the solar radiation and other radiations incident on the collector. This grid also suppresses secondary electrons emitted by the collector. All the traps were located in the meridional plane of the container. Different potentials were given to the outer grids in order to estimate the energy of the positive particles entering the traps and, in particular, to distinguish between currents due to stationary gas particles (energies of the order of 1 eV) and currents due to protons in the corpuscular streams, whose energies are higher by two or three orders of

Card 2/9

83233
S/033/60/037/004/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

magnitude. Current amplifiers were provided and positive currents between 10^{-10} and 5×10^{-9} and negative currents between 10^{-10} and 2×10^{-9} A could be measured. In the case of the second cosmic rocket the potentials of the outer grids (g_2) were -10, -5, 0 and 15 V, respectively. The collectors and the inner (anti-photoelectric) grids were plane. The traps were located at the corners of a tetrahedron inscribed into a sphere. In these traps the photoelectrons due to solar radiation and emitted from the outer grid do not reach the collector and the collector photo-current is completely suppressed by the electric field between the collector and the inner grid. Photoelectrons from the latter are partly ejected from the trap or strike the outer grid and are partly intercepted by the collector giving rise to a negative current in the collector circuit. In this way, the negative current in the collector circuit due to the illumination of the inner grid

Card 3/9

83233
S/033/60/037/004/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particl. Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

was reduced by an order of magnitude compared with the traps mounted on the first rocket. Most of the aluminium surface of the container was covered by an Al_2O_3 coating (or film). If the potential on g_2 is less than kT/e then the positive ions due to the stationary interplanetary gas penetrate into the space bounded by g_2, are accelerated in the field between g_1 and g_2 and, on passing through g_2, enter the collector. Thus "0 volt", "-5 volt" and "-10 volt" traps should record ions due to the stationary plasma which would be larger for lower values of the potential on g_2. If the latter is very much greater than kT/e, then the ions will not pass through g_2 and the +15 V trap will not record ions due to the stationary gas with a temperature of, say, 10 000 °K. The electrons due to the ionised gas do not enter the collector since they are ejected by the field between

83233
S/033/60/037/004/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

g_2 and g_1 (200 V). However, energetic electrons belonging to the radiation belts cannot be stopped by the g_1 grid and electrons with energies greater than 200 eV give rise to negative collector currents. Measurements obtained with these traps were corrected for the effect of the potential of the container and its motion. Fig. 6 shows the currents measured on September 12 1959 at altitudes up to 25 000 km, using traps with $V_{g_2} = 0$ and +15 V. The translational motion of the container is accompanied by the simultaneous rotational motion and hence the orientation of each trap relative to the velocity of the container and the direction of the Sun varies continuously. The maximum and minimum values of the collector current correspond to certain definite orientations of the container In order to exclude the effect associated with the rotation of the container, the

Card 5/9

83233
S/033/60/037/04/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

experimental results can be shown in the form of curves connecting the maximum and minimum values of the collector currents. In Fig. 7, Curves 1, 2, 3 and 4 are the upper limits of the recorded values of collector currents with the potential of the outer grids relative to the container equal to -10, -5, 0 and +15 V, respectively. Curve 5 is the lower boundary of the collector currents for three traps, in which the potential of the outer grid relative to the body of the container was negative or zero. These curves show the considerable dependence of the current due to positive particles reaching the collector on the potential of the outer grid. At altitudes exceeding 3 000 km the positive potential of the outer grid retards the positive ions almost entirely and prevents them from reaching the collector. The lack of similarity between Curves 1, 2 and 3 can be ascribed to changes in the orientation of the traps relative to the velocity vector and the direction of the Sun. Fig. 8 shows the data obtained with the second cosmic rocket. The upper continuous curve shows the

Card 6/9

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

upper boundary of the measured values of the currents in three traps with the outer grid potentials negative and zero. The dotted curve represents the upper boundary of the values of the collector current for the trap with outer grid potential euqal to +15 V. The lower curve is the lower boundary of the measured collector currents in all the traps. In this part of the trajectory (25 000 - 100 000 km) the positive collector currents are practically absent from all the traps while near 60 000 - 70 000 km the collector currents in all the traps are simultaneously negative. Fig. 9 shows the upper boundary of the values of collector currents for traps with negative and zero outer grids, respectively. The crosses refer to V_{g_2} = -10 V and the open circles to V_{g_2} = 0 V. These were recorded using traps mounted on the first cosmic rocket. Fig. 10 shows the currents for the "25 V" and the "-10 V" traps recorded at altitudes up to 8 000 km. The "25 V" results are represented by the triangles and the "-10 V" results by the points. These results

83233
S/033/60/037/004/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

are still being examined. The final conclusions are summarised as follows:
1) the Earth is surrounded by a plasma having an ion concentration of $\sim 10^3$ cm^{-3}, which extends to R $\simeq$ 22 000 km. The density of this plasma, which can be looked upon as the ionised component of the "geocorona", decreases regularly with altitude.
2) The concentration of interplanetary ionised gas in the neighbourhood of the Earth is less than 100 cm^{-3} and very probably less than 30 cm^{-3}.
3) In the region of the radiation belt there are few electrons having energies greater than 200 eV. In the region between 55 000 and 75 000 km, the concentration of these electrons reaches a maximum. It follows that the energy spectrum of the electrons in the region of the maximum of the outer radiation belt is much harder than beyond its outer boundary.
4) A new radiation belt has been established. This belt surrounds the Earth and is located between 55 000 and 75 000 km. It consists

Card 8/9

83233
S/033/60/037/004/009/012
E032/E314

Results of Observations Obtained with the Aid of Charged-particle Traps Mounted on Soviet Cosmic Rockets at Altitudes up to 100 000 km

of electrons with relatively low energy (although greater than 200 eV). Further studies of this new radiation belt are said to be urgently required.
There are 11 figures, 1 table and 26 references: 1 German, 10 English and 15 Soviet.

ASSOCIATIONS: Radiotekhnicheskiy institut Akademii nauk SSSR (Radiotechnical Institute of the Ac.Sc., USSR)
Gos. astronomicheskiy in-t im. P.K. Shternberga (State Astronomical Institute imeni P.K. Shternberg)

Card 9/9

9.9100 (2101, 1041, 1046)

S/035/60/037/005/019/024
E032/E314

AUTHORS: Shklovskiy, I.S., Moroz, V.I. and Kurt, V.G.

TITLE: On the Nature of the Earth's Third Radiation Belt

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol. 37, No. 5, pp. 931 - 934

TEXT: Results obtained with the aid of ion traps set up on Soviet cosmic rockets indicate the presence of a third (outermost) radiation belt (Ref. 1). This belt consists largely of relatively soft electrons with energies greater than 200 eV. In the region of the so-called second radiation belt and up to altitudes of about 50 000 km the flux of electrons with energies greater than 200 eV is less than 2×10^7 cm^{-2} sec^{-1}. On the other hand, in the region $55\,000 < R < 75\,000$ km the flux is about 2×10^8 cm^{-2} sec^{-1}. Thus (as was shown in Ref. 1), the second belt should consist mainly of electrons having relatively high energies (a few hundreds of keV) and these electrons move in the magnetic trap. The problem therefore arises as to what is the nature of the electrons forming the third (outermost) radiation

Card 1/3

84934
S/033/60/037/005/019/024
E052/E314

On the Nature of the Earth's Third Radiation Belt

belt. In this connection it must be emphasised that both during the January and September launchings of Soviet cosmic rockets the solar activity and the magnetic disturbances were at a low level. However, there are grounds for supposing that even during periods of low activity the Sun constitutes a source of a permanent though relatively weak corpuscular emission, i.e. it gives rise to the so-called "solar wind". It is argued that the third radiation belt is formed as a result of the interaction of this "solar wind" and the Earth's magnetic field and this leads to a redistribution of the energy, resulting in a net transfer from the protons to the electrons. The third radiation belt is a formation characteristic of magnetically quiet periods, when solar activity is low. It may be expected that during periods of high solar activity, when intense corpuscular streams reach the Earth's atmosphere, both the third and second belts will be deformed, and their characteristics will be strongly affected. It is suggested, therefore, that the experiments should be repeated at periods of high solar activity.

Card 2/3

S/053/60/037/005/010/014
E032/E314

On the Nature of the Earth's Third Radiation Belt

It is pointed out that the energy density of the Earth's magnetic field is consistent with the measured value of the charged-particle flux. It is argued that the concentration of stationary interplanetary plasma does not exceed the corpuscular concentration of the "solar wind", i.e. about 1 cm^{-3}.

Acknowledgments are expressed to S.B. Pikel'ner for discussions in connection with the present work.

There are 10 references: 6 Soviet, 1 Swedish and 3 English.

ASSOCIATION: Gos. astronomicheskiy institut imeni P.K. Shternberga (State Astronomical Institute imeni P.K. Shternberg)

SUBMITTED: April 15, 1960

Card 3/3

An Ionized Gas and Fast Electrons in the Vicinity of the Earth and in Interplanetary Space

81700
S/020/60/132/05/25/069
B014/B125

the plasma, $n_1 \geq 10$ cm^{-3} and temperature is not too high ($T = 10^4$ °K). Reference is made to the existence of the plasma of the earth corona, which is found at about R = 15,000 km. Calculated and experimentally determined concentration distributions of the ions as dependent on R are graphically represented in Fig. 3. A steep drop of the ion concentration begins at 15,000 km; this fact requires more exact study. Only an upper limit of 30-60 cm^{-3} can be given for the ion concentration in the range of R greater than 22,000 km. The authors mention among others V. G. Fesenkov (Ref. 10). There are 3 figures and 12 references: 7 Soviet, 3 American, 1 English, and 1 German.

PRESENTED: March 1, 1960, by A. L. Mints, Academician

SUBMITTED: February 24, 1960

Card 3/3

81700
S/020/60/132/05/25/069
B014/B125

3.9000

AUTHORS: Gringauz, K. I., Kurt, V. G., Moroz, V. I., Shklovskiy, I. S.

TITLE: An Ionized Gas and Fast Electrons in the Vicinity of the Earth and in Interplanetary Space

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5, pp. 1062 - 1065

TEXT: As the results of the second Soviet cosmic rocket indicate, the first half of its orbit can be divided into four parts. The first extends to a distance from the earth R = 22,000 km. Significant positive collector currents occur at all traps with negative or zero potentials. In the second part, from 22,000 km to 50,000 km, the collector currents varied between zero and several negative values. In the range from 50,000 km to 70,000 km (third part) negative currents occur in all traps. With R greater than 70,000 km (fourth part) the currents vary in all traps between 0 and $5 - 6 \cdot 10^{-10}$ a. These results agree in all three

Card 1/3

81700
An Ionized Gas and Fast Electrons in the Vicinity of the Earth and in Interplanetary Space

S/020/60/132/05/25/069
B014/B125

Soviet cosmic rockets. Further the estimation of the ion concentration was dealt with according to the data and it was determined that one must know the potential of the receiver in this connection. This potential depends on the fluxes of high-energy electrons (> 200 ev) and the most important information on this was obtained with the help of the measurements of the three-electrode traps. From an extensive investigation it is seen that in the first part of the orbit the flux of electrons with an energy higher than 200 ev does not exceed $2 \cdot 10^7$ $cm^{-2} \cdot sec^{-1}$. Only electrons with more than 200 ev (flux $1 \cdot 10^8 - 2 \cdot 10^8$ $cm^{-2} sec^{-1}$) were found in the third part of the orbit. The existence of a third radiation belt, the lower boundary of which was at 30,000 km on February 2, 1959, follows from the characteristics of the results discussed here. Further, the influence of the photoelectric effect induced by ultraviolet solar radiation on the potential of the receiver is investigated. As calculations show, the potential differs from zero only by several volts when with n_i representing the ion concentration in

Card 2/3

81700
S/020/60/132/05/25/069
B014/B125

An Ionized Gas and Fast Electrons in the Vicinity of the Earth and in Interplanetary Space

the plasma, $n_i \geq 10$ cm^{-3} and temperature is not too high ($T = 10^4$ °K). Reference is made to the existence of the plasma of the earth corona, which is found at about R = 15,000 km. Calculated and experimentally determined concentration distributions of the ions as dependent on R are graphically represented in Fig. 3. A steep drop of the ion concentration begins at 15,000 km; this fact requires more exact study. Only an upper limit of 30-60 cm^{-3} can be given for the ion concentration in the range of R greater than 22,000 km. The authors mention among others V. G. Fesenkov (Ref. 10). There are 3 figures and 12 references: 7 Soviet, 3 American, 1 English, and 1 German.

PRESENTED: March 1, 1960, by A. L. Mints, Academician

SUBMITTED: February 24, 1960

Card 3/3

KULAGIN, S.G.; KOVBASYUK, L.D.; DAGAYEV, M.M.; LAZAREVSKIY, V.S.; DEMIDOVICH, Ye.G.; BRONSHTEN, V.A.; YAKHONTOVA, N.S.(Leningrad); KUROCHKIN, N.Ye.; DOKUCHAYEVA, O.D.; SHCHERBINA-SAMOYLOVA, I.S.; MASEVICH, A.G.; LIPSKIY, Yu.N.; MARTYNOV, D.Ya.; ARSENT'YEV, V.V.; MOROZ, V.I.; MASEVICH, A.G.; PEREL', Yu.G.; BAKULIN, P.I., otv. red.; KULIKOV, G.S., red.; AKHLAMOV, S.N., tekhn. red.

[Astronomical calendar; yearbook.Variable part, 1962] Astronomicheskii kalendar'; ezhegodnik. Peremennaia chast', 1962. Red. kollegiia: P.I.Bakulin i dr. Moskva, Gos.izd-vo fiziko-matem. lit-ry, 1961. 259 p. (Vsesoiuznoe astronomo-geodezicheskoe obshchestvo, no.65) (MIRA 14:12)

1. Gosudarstvennoye astronomo-geodezicheskoye obshchestvo (for Kalugin, Kovbasyuk, Lazarevskiy, Demidovich). 2. Moskovskoye otdeleniye Vsesoyuznogo astronomo-geodezicheskogo obshchestva (for Dagayev, Bronshten, Kurochkin).
(Astronomy—Yearbooks)

25989
S/560/61/000/006/007/010
E032/E114

9,9100

AUTHORS: Gringauz, K.I., Kurt, V.G., Moroz, V.I., and Shklovskiy, I.S.

TITLE: Ionized gas and fast electrons in the earth's neighbourhood and in planetary space

PERIODICAL: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. No. 6. Moscow, 1961. pp. 108-112

TEXT: This paper was first published in Doklady AN SSSR, Vol.132, page 1062, 1960.
K.I. Gringauz, V.V. Bezrukikh, V.D. Ozerov and R.E. Rybchinskiy (present issue, page 101 - Ref.1) showed that the first half of the trajectory of the second Soviet space rocket can be divided into four parts, namely: 1) distances up to R = 22000 km (R is the distance from the earth's surface) where all the traps with negative or zero potential recorded appreciable collector currents, while the trap whose potential relative to the body was + 15 V showed either very small negative currents or no current at all; 2) distances in the range 22000-50000 km, where collector currents in all the traps varied between zero and some negative values

Ionized gas and fast electrons .....

($I_c < 6 \times 10^{-10}$ amp); 3) distances in the range 50000-70000 km where negative currents were recorded in all the traps and the absolute maximum and minimum currents were 10^{-9} and 3×10^{-10} amp respectively; 4) distances greater than 70000 km where currents in all the traps oscillated between zero and approximately - (5-6) x 10^{-10} amp, which apparently represents the maximum photoelectric current due to the inner grid which is intercepted by the collector. The overall trend of the results was found to be the same for all the three flights of Soviet space rockets. Analysis of all the results has led the present authors to the scheme indicated in Fig.2 in which 1 is the 'inner' belt, 2 is the 'outer' belt, 3 is the third belt (now postulated), and 4 is the geomagnetic equator. In the region of between 50000 and 70000 km the negative currents of all the traps, which reached 10^{-9} amp, can only be explained by electrons with energies in excess of 200 eV and $N_e \sim 10^8 - 2 \times 10^8$ $cm^{-2}sec^{-1}$. The third belt therefore consists of relatively low energy electrons which explains why previous experiments did not detect its presence. Experiments carried out from the third Soviet artificial satellite (Ref.8: V.I. Krasovskiy, I.S. Shlkovskiy, Yu.I. Gal'perin, Ye.M. Svetlitskiy, Dokl. AN SSSR, V.127, 78, 1959)

Ionized gas and fast electrons .....

at R = 1800 km and above moderate geomagnetic altitudes indicate the presence of electrons with about 10 keV (up to 3×10^8 $cm^{-2}sec^{-1}$). This may mean that in the region of the radiation belts the concentration of soft electrons is a minimum. However, the experiment reported in Ref.8 was not simultaneous with that described in the present paper. The readings of the trap with zero potential over the first section of the trajectory can be used to estimate the plasma ion concentration. Fig.3 shows the plasma ion concentration as a function of the distance from the earth's surface [1 - theoretical distribution with $T = 1.8 \times 10^3$; 2, 3, 4 - experimental results with T = 1800, 1000 and 5000° respectively; points a and b represent measurements at 470 and 800 km respectively (third artificial earth satellite)]. It follows from Fig.3 that the plasma is not the interplanetary ionized gas, and in fact it is an extended shell which is a part of the ionized component of the outermost part of the earth's atmosphere, i.e. that so called geocorona.
There are 3 figures and 12 references: 7 Soviet and 5 non-Soviet. The four most recent English language references read as follows:

Card 3/6

25989
S/560/61/000/006/007/010
E032/E114

Ionized gas and fast electrons .....

Ref.3: J.A. Van Allen, L.A. Frank. Nature, V.183, 430, 1959.
Ref.5: J.A. Van Allen, L.A. Frank. Nature, V.184, 219, 1959.
Ref.6: J.A. Van Allen, C.E. McIlwain, G.H. Ludwig.
J. Geoph. Res., V.64, 271, 1959.
Ref.11: H.C. van de Hulst. Light Scattering by Small Particles.
London, 1957.

Card 4/6

S 2300 (1121)

S/560/61/000/007/007/010
E032/E514

AUTHORS: Kart V.G. and Moroz V.I.

TITLE: The potential of a metal sphere in interplanetary space

PERIODICAL: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli No 7 Moscow 1961 pp 78-88

TEXT: The design and interpretation of certain experiments in interplanetary space necessitate the knowledge of the potential of the container carrying the payload. The present authors report an attempt to solve this problem in the first approximation by inclusion of only the most important factors. Containers used with Soviet space rockets were approximately spherical in form and hence the solutions obtained in the present paper are concerned with spherical metal bodies. The potential can be found from the condition that the total current to the sphere

$$I_s = I_e + I_p + I_r \qquad (1)$$

is zero. In this expression I_e is the current of electrons from the interplanetary plasma, I_p the current of radiation-

Card 1/5

The potential of a metal sphere [illegible]

belt electrons. I_p is the plasma ion current (protons), I_{rp} is the current of radiation belt protons, I_γ is the photoelectric current and I_B is the current of secondary electrons produced by radiation belt electrons and protons. N. I. Gringauz and M. Kh. Zelikman [Usp. Fiz. Nauk 63, No 1(2), 239, 1957] have considered the analogous problem for artificial earth satellites by neglecting all the terms in Eq. (1) except for I_p and I_e. This is permissible at relatively low altitudes where the ion and electron concentrations are high (greater than 10^4 cm^{-3}) so that the photocurrent and radiation belt electrons have little effect on the potential. In the case of a space rocket, such simplifications are inadmissible. The present authors show that if the temperature of the interplanetary gas is assumed to be 10^4 °K and the photocurrent is 2.5×10^{-9} amp/cm^2 (these are the most probable values available), then over the illuminated part of the trajectory the potential of the container should lie between -2.5 and +.4 if the ion concentration is greater than 10 cm^{-3}. The effect of the magnetic field and the motion of the container has a small effect (1 - 2 V) on the potential. This change can be

Card 2/5

neglected in comparison with other unknown factors In the region of the outer belt and over the illuminated part of the trajectory, the radiation belt electrons make a smaller contribution than the other factors involved at least during magnetically quiet days. However large negative potentials (up to several kV) are not excluded if the present information about the high concentration of soft radiation belt electrons in the outer belt is correct and the interplanetary gas in the region of this belt is sufficiently rarefied If this is so then considerable negative potentials can appear even with relatively low fluxes N_o. For example, if the ion concentration is 1 cm^{-3} and $N_o = 3 \times 10^8$ cm^{-2} sec^{-1} then U - 25 V It is also found that the potential is not very sensitive to changes in the diameter. Small departures from the spherical form also have little effect. Fig.2 shows an example of the determination of the potential U for the case n_e = 1000 cm^{-3} T 10^4 K I_{photo} = 5 x 10^{-9} amp/cm^2 (I_{photo} = 10^5 esu) [1 - proton current I_p, 2 - $I_p + I_{photo}$; 3 - electron current I_e 4 - $I_e + I_{ph}$ at N 10^{18} cm^{-2} sec^{-1}

Card 3/5

The potential of a metal sphere S/560/61/000/007/007/010
E032/E514

5 $I_e + I_{re}$ at $N_o = 3 \times 10^{10}$ cm^{-2} sec^{-1} ... $I_{photo} = 0$ and $I_{re} = 0$ then U = -2 V if $I_{photo} = 10^5$ esu and ... 10^{10} cm^{-2}sec^{-1}, then U = -15 V) There are 3 figures, 3 tables and 31 references: 11 Soviet and 20 non-Soviet. The four latest English-language references read as follows: H. E. Hinteregger, K. P. Damon, L. A. Hall, J. Geoph. Res., 64, 961, 1959; M. H. Rees, W. A. Rense, J. Geoph. Res., 64, 1251, 1959; J. Van Allen, L. A. Frank, Nature, 184, 219, 1959; J. Van Allen, Trudy Mezhdunarodnoy konferentsii po kosmicheskim lucham, Vol. III, izd-vo AN SSSR, Moscow, 1960 (Proceedings of the International Conference on Cosmic Rays)

Card 4/5

MOROZ, V.I.

Answer to ... Kodionov and A.... Gurevich's letter to the ... Astron. ... v. 38 no. 1 [illegible] Ja-F '61. ... 1/2)
(Light sky—Spectra)

3,5131
3,2720

40443

P/048/61/000/003/002/004
I004/I204

AUTHORS Gringauz, K. I., Kurt, W. G., Moroz, V. I., Szkołwski, I. S

TITLE Ionized gas and fast electrons in the vicinity of Earth and in in interplanetar space

PERIODICAL Astronautyka no 3, 1961, 8—10

TEXT The purpose of this work is to analyze the distribution and nature of radiation in the space surrounding earth with regard to the resultant danger to manned space flights. Data gathered by the second Soviet cosmic rocket show that four different concentrations of ions can be distinguished along the first half of its trajectory. In the first portion, extending up to R = 22,000 km (R — the distance from the surface of earth), all counters with negative or zero potential registered high positive collector currents while in counters with + 15 v charge relative to the housing, the currents were either small and negative or zero. In the second portion, between 22,000 and 50,000 km, the collector currents varied between zero and negative values. The third portion, 50,000 70,000 km, showed negative current in all traps. Above 70,000 km current values were as in portion 2. The current variations in the "+ 15 V" trap indicate that the electron flux in the outer radiation belt is below $2 \cdot 10^7$ cm^{-2} sec^{-1}. This contradicts the established idea that there exist large electron streams of E ≈ 20 to 30 kev in the maximum region of the outer radiation belt. It is assumed that the density of the kinetic energy of the electrons there, is by several orders of magnitude smaller than the energy density of the magnetic field of earth. There are 3 figures.

Card 1/1

LAUTA, S.P.; MOROZ, V.I.

"Socialist transformations in the western provinces of the Ukraine (prewar perild)" by V.L.Varets'kyi. Reviewed by S.P.Lauta, V.I.Moroz. Dop.AN URSR no.3:401-403 '61. (MIRA 14:3)
(Ukraine, Western—History)
(Varets'kyi, V.L.)

MOROZ, V.I.

An attempt to observe the infrared radiation of the galactic nucleus.
Astron.zhur. 38 no.3:487-490 My-Je '61. (MIRA 14:6)

1. Gosudarstvennyy astronomicheskiy institut imeni P.K.Shternberga.
(Milky way) (Radio astronomy)

MOROZ, V.I.

Brightness of the night sky in the region 0.9- 1.8 μ. Astron.zhur. 38 no.5:998-1000 S-O '61. (MIRA 14:9)

1. Gosudarstvennyy astronomicheskiy institut im. P.K.Shternberga.
(Night sky)

32434

3,1550 (1041, 1057, 1559)

S/033/61/038/006/003/007
E133/E435

AUTHOR: Moroz, V.I.

TITLE: On the infra-red spectra of Jupiter and Saturn (0.9 - 2.5 μ)

PERIODICAL: Astronomicheskiy zhurnal, v.38, no.6, 1961, 1080-1084

TEXT: The infra-red spectra of these planets were intensively studied by Kuiper in 1947, who used the 82" reflector at MacDonald (Ref.1: Astrophys. J., v.106, 1947, 251; Ref.2: G.R.Kuiper. Sympos. "Atmospheres of the Earth and the Planet" in Russian translation, IIL, Moscow, 1951, p.341). The present author has made further measures using a photoelectric grating spectrometer with a lead sulphide photoresistor on the 50" reflector of the Krymskaya astrofizicheskaya observatoriya (Crimean Astrophysical Observatory). The grating has 300 lines/mm. The resolving power did not normally exceed 200. Filters with $\lambda_{min} \simeq 0.85\,\mu$ and $\simeq 1.70\,\mu$ were used to separate the orders. The dispersion in the first order was 40 Å/mm. The images of Jupiter and Saturn were such that the slit covered 30 to 50% of the area of the former and all of the latter, including most of the rings.

Card 1/6

S/033/61/038/006/003/007
E133/E435

On the infra-red spectra ...

Twenty two spectral traces of Jupiter and eighteen of Saturn were obtained in the wavelength range 0.9 to 2.5 μ, although any particular trace only covered a small part of this interval. Fig.1 compares a typical spectrum of (1) Jupiter, (2) Saturn and (3) the Sun. The spectrum of Jupiter agrees well with that found by Kuiper. There may be a new, very weak, feature near 2.1 μ. On the other hand, the spectrum of Saturn differs considerably from Kuiper's. He found that the spectra of Jupiter and Saturn were closely comparable whereas the present work indicates a considerable difference. This can be explained by the fact that the present spectrograms include the rings as well as the planet. Kuiper suggested that either the rings consisted of particles covered with hoar-frost, or they were made entirely of snow. The emission found in the present spectra in the range 2.2 to 2.3 μ can be explained in terms of reflection from such particles. The author compares the reflectivity of the above materials with laboratory results (Fig.2). Here 1 represents the reflectivity of snow, 2 - the reflectivity of hoar frost and 3 - the solar spectrum. A comparison indicates that the reflection spectrum from the rings

Card 2/ 6

most closely resembles that of hoar-frost. The temperature of the particles in the rings can be obtained from the work of F. D. Drake and H. I. Ewen (Ref.5: Proc. I.R.E., v.46, no.1, 1958) using values of 10 cm to 1 m for the dimensions of the particles (Ref.6: M.S.Bobrov, Astron. zh. v.33, 1956, 905). Kuiper found a temperature of 60 to 70°K. The maxima of CH_4 and NH_3 bands indicated are those published in Fig.1. The telluric bands are shown in square brackets. The "equivalent path" for NH_3 on Jupiter at $\lambda = 1.51\ \mu$ is less by an order of magnitude than at $\lambda = 0.645\ \mu$. On the other hand, the "equivalent path" for CH_4 does not depend on wavelength in this region. These observations can be explained if the ammonia producing the absorption is concentrated at the level of the cloud layer, whereas the methane occurs at greater heights. The temperature of the cloud level on Jupiter is 135°K. It is therefore possible that the Jovian cloud layer consists of solid ammonia particles. There are 2 figures and 11 references: 3 Soviet-bloc, 3 Russian translations of non-Soviet-bloc publications and 5 non-Soviet-bloc. The four references to English language publications read as follows: Ref.1: as quoted in text; Ref.3: G.R.Kuiper, W.Wilson,

32434

S/033/61/038/006/003/007
E133/E435

On the infra-red spectra ...

R.J.Cashman, Astrophys. J., v.106, 1947, 243;
Ref.5: as quoted in text,
Ref.9: R.Robertson, J.Fox, Proc. Roy. Soc., A. 120, 1928 168.

ASSOCIATION: Gos astronomicheskiy in-t im. P.K.Shternberga
(State Astronomical Institute im. P.K.Shternberg)

SUBMITTED: January 19, 1961

Card 4/8/

MOROZ, V. I.

"New details in the Infra-red Spectrum of Venus"

Soviet Papers presented at Plenary Meetings of Committee on Space Research (COSPAR) and Third International Space Sumposium, Washington, D. C. 23 Apr - 9 May 62

MOROZ, V. I.

"Infrared Spectra and The Problem of The Physical Conditions on The Surface of Venus"

report presented at the 13th Intl. Astronautical Federation Congress (IAF) Varna, Bulgaria, 23-29 Sep 1962

43991

S/560/62/000/012/014/014
I063/I263

AUTHOR: Moroz, V.I.

TITLE: On the "dust envelope" of the earth

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli, no 12 Moscow, 1962, 151-158

TEXT: A critical review of Western and Russian scientific publications dealing with the origin and space distribution of dust particles around the earth is presented. The author reviews the different methods for calculation of micrometeorite density based on collision measurements carried out on space rockets. He assumes that a) most of the colliding micrometeorites belong to the zodiacal cloud , b) the particle-rocket collision velocity is 15 km/sec as suggested by Whipple (1) and c) the mass distribution of the dust particles is given by the law $n(>m) = km^{-1}$ (n = number of colliding particles, m = mass of the particles, k = constant) as proposed by Beard (2) and confirmed experimentally (1,3). The densities of the dust particles were accordingly calculated at different heights

Card 1/3

S/560/62/000/012/014/014
I063/I263

On the "dust envelope"...

from the earth. As a result the "envelope" of dust particles around the earth can be divided into three zones in the following manner:
1) Zone of 100-400 km where $N \approx 0.1 - 1\ m^{-2}sec^{-1}$
2) Zone of 400 to $2R_3$ where $N \approx 10^{-6}-10^{-4}\ m^{-2}sec^{-1}$
3) Zone $h \geq 2R_3$ where $N \approx 10^{-6}-10^{-4}\ m^{-2}sec^{-1}$
where N = flux of colliding particles, R_3 = radius of the earth. The higher condensation of the dust material within the second zone compared with the third zone can be explained by the effect of gravitational concentration and because decrease of rocket's velocity at greater distances from the earth wasn't taken into account in the calculations. Other hypotheses regard the origin of condensation within the second zone as due to the capture of particles into orbits around the earth. Whipple (4) supposes that such particles are supplied by explosions of meteorites on the moon surface, whereas Ruskol (E.L. Ruskol, On the origin of condensation of interplanetary dust around the earth, ibid, 145-150), assumes that particles of the

Card 2/3

S/560/62/000/012/014/014
I063/I263

On the "dust envelope"...

zodiacal cloud are captured through non-elastic collisions in the vicinity of the earth. These hypotheses do no explain the condensation within the first zone. The material in this zone comes from the shattering of easily fusible bodies of cometic origin into smaller ones as a result of the interaction of free radicals with the atmosphere. These smaller bodies evaporate later in the lower layer of the atmosphere (5).

There are 2 tables, 1 figure, and 24 references.

The most important English language references are:

1. F.L. Whipple, Medical and Biological aspects of the energies in space, Columbia Univ. Press, N.Y., 1961
2. D. Beard, Astrophys. J., 105, 471, 1947
3. H.E. LaGow, W.M. Alexander, Space Research, V. I. North-Holl. Publ. Co., Amsterdam, 1960, p.1033
4. F.L. Whipple, Nature, 189, 127, 1961
5. D.H. Robey, J. Brit. Interplanetary Soc., 17, 20, 1959.

SUBMITTED: September 28, 1961

Card 3/3

MOROZ, V.I.

Stellar magnitude of the jet in NGC 4486. Astron.zhur. 39 no.1:161-162 Ja-F '62. (MIRA 15:2)

1. Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga.

(Galaxies)

MOROZ, V.I.

"Recent Observations of Infrared Spectra of Planets (Venus 1-4μ, Mars 1-4μ, Jupiter 1-1. 6μ)."

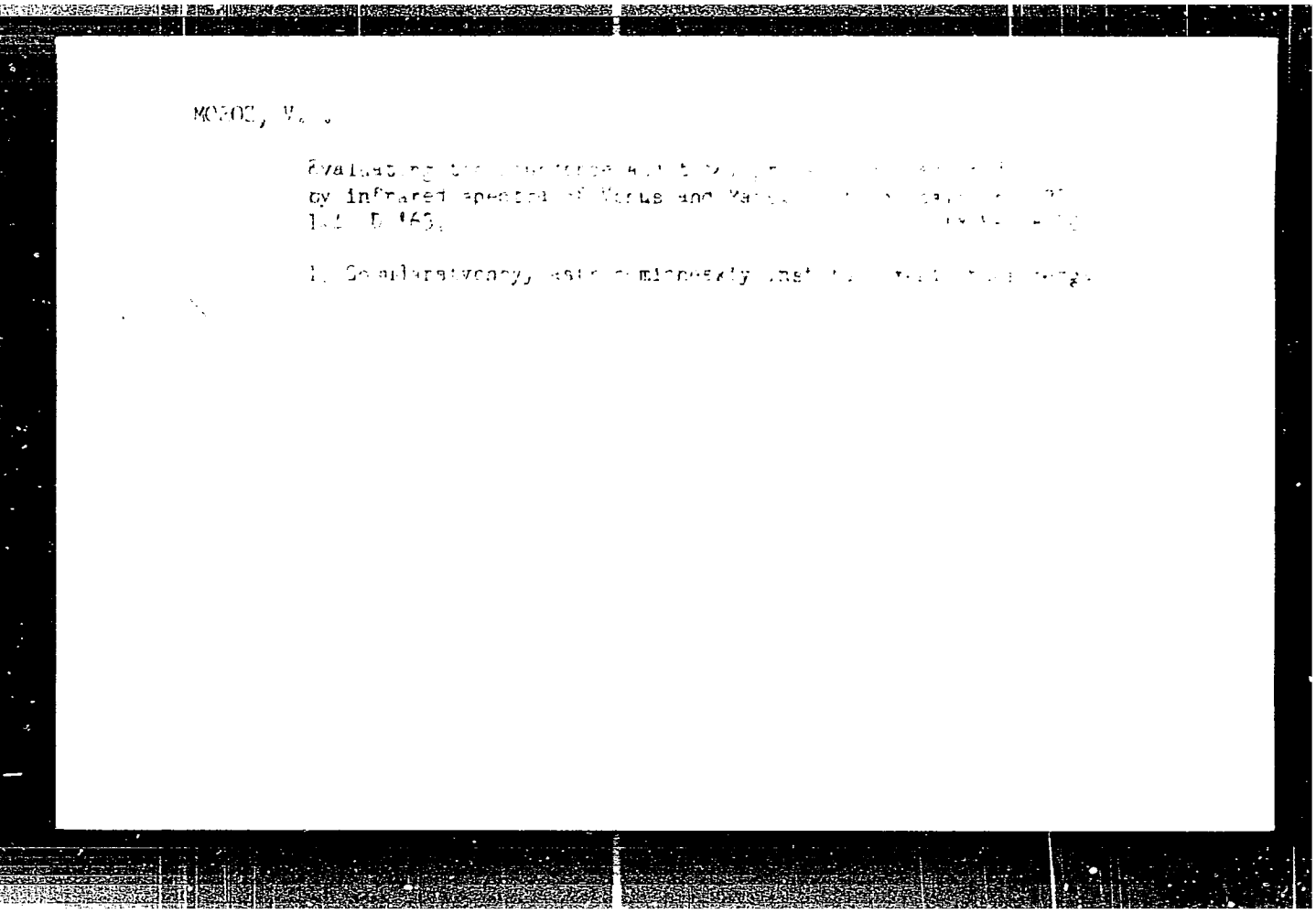
Report presented at the 12th International Astrophysical Colloquium, Liege, Belgium, 24-26 Jun 63.

MOROZ, V.I.

Venus

Reports of the following Soviet Scientists were presented at the XIIIth International Congress on Astronautics in Varna, Bulgaria,

P: Tekhnika Molodezhi, #1, 1963, pp. 24-25



45605
S/033/63/040/001/012/016
E032/E314

3,1550

AUTHOR: Moroz, V.I.

TITLE: The infrared spectrum of Venus (1 - 2.5 μ)

PERIODICAL: Astronomicheskiy zhurnal, v. 40, no. 1, 1963, 144 - 153

TEXT: This experimental study was made in 1961-1962 with a view to detecting new details in the infrared spectrum. The observations were carried out in the Cassegrain focus of the 122 cm reflector of the Krymskaya astrofizicheskaya observatoriya (Crimean Astrophysical Observatory) (1961) and the 125 cm reflector of the Gosudarstvennyy astronomicheskiy institut im. Shternberga (Shternberg State Astronomical Institute) (1962). The diffraction spectrometer employed incorporated a PbS detector and had a dispersion of 40 Å/mm. The complete averaged spectrum for the above range is reproduced. It contains six new planetary details not included in Kuiper's list (The atmospheres of the Earth and Planets, revised edition, Chicago, 1952, p. 306). These six details (1.555, 1.631, 1.617, 2.082, 2.095 and 2.110 Å) are included in the results reported by Gebbi et al (Monthly Notices,

Roy. Astron. Soc., 123, 497, 1962). The last three bands in the above list are ascribed to $C^{12}O^{16}_2$ and $C^{13}O^{16}_2$. A general review is then made of all the available data on the chemical composition of the Venusian atmosphere and it is estimated that the relative abundance of $C^{12}O^{16}_2$ and $C^{13}O^{16}_2$ is 100 - 200, i.e. about the same as in the Earth's atmosphere. A special series of observations was carried out in June, 1962, in order to determine the monochromatic albedo of Venus in the region 1 - 2.5 μ (Fig. 4). The monochromatic albedo curve does not exhibit any features characteristic of the absorption bands of ice. In particular, there are no traces of the 1.5 μ band. It appears that the clouds consist neither of ice nor of water vapour but of dust. It is estimated that the mean diameter of the particles is of the order of 1 μ but their chemical composition is not known. The form of the monochromatic albedo curve in the region 1.5 - 2.5 μ shows no evidence of a greenhouse effect due to the presence of water vapour. There are 5 figures and 4 tables.

ASSOCIATION: Gos. astronomicheskiy in-t im. P.K. Shternberga
(State Astronomical Institute im. P.K. Shternberg)

L 31181-65 EWT(1)/EWG(v)/EEC(t) Pe-5/Pae-2 GW

ACCESSION NR: AR5004838 S/0269/64/000/012/0065/0065

SOURCE: Ref. zh. Astronomiya. Otd. vyp., Abs. 12.51.527

AUTHORS: Moroz, V. I.

TITLE: Estimates of the carbon dioxide content and the total pressure from the infrared spectra of Venus and Mars

CITED SOURCE: Astron. tsirkulyar, no. 273, dek. 14, 1963, 1-4

TOPIC TAGS: infrared spectrum, absorption spectrum, Venus planet, Mars planet, carbon dioxide, planetary atmosphere

TRANSLATION: The intensities of saturated molecular absorption bands make it possible to calculate the product of the amount of absorbed matter u by the total pressure p, or of the relative concentration α by the square of the total pressure. Using his own observations of the infrared spectra of Venus and Mars, the author determines these quantities from the CO_2 bands near 1.6 μ. In the case of Venus, he obtains $up^2 = 4.1 \times 10^{-3}$ atm^2. If we assume $\alpha = 0.05$, according to H. Spinrad (RZhAstr, 1963, 8.51.419), then near the effective level of formation of the bands

Card 1/2

L 34181-65
ACCESSION NR: AR5004838

at 1.6 μ we have $p \approx 0.3$ atm and $u = 2.5$ g/cm^2. For Mars the value obtained was $up = 0.143$ gcm^{-2}mb. The intensities of the unsaturated absorption bands make it possible to determine u independently of p. Such a band, λ 8600, was discovered in the spectrum of Mars at the sensitivity limit by Spinrad, Munch, and Kaplan (RZhAstr, 1964, 2.51.529). If we assume that to observe the band it is necessary to have not less than 20 g/cm^2 of CO_2 along the line of sight (that is, at the zenith $u \geq 7$ g/cm^2), then the pressure is found to be very low: $p < 20$ mb. V. Moroz.

SUB CODE: AA, OP ENCL: 00

Card 2/2

L 34180-65 EWT(l)/EWG(v)/EEC(t) Pe-5/Pas-2 GW

ACCESSION NR: AR5004837 S/0269/64/000/012/0063/0063

SOURCE: Ref. zh. Astronomiya. Otd. vyp., Abs. 12.51.518

AUTHORS: Moroz, V. I.

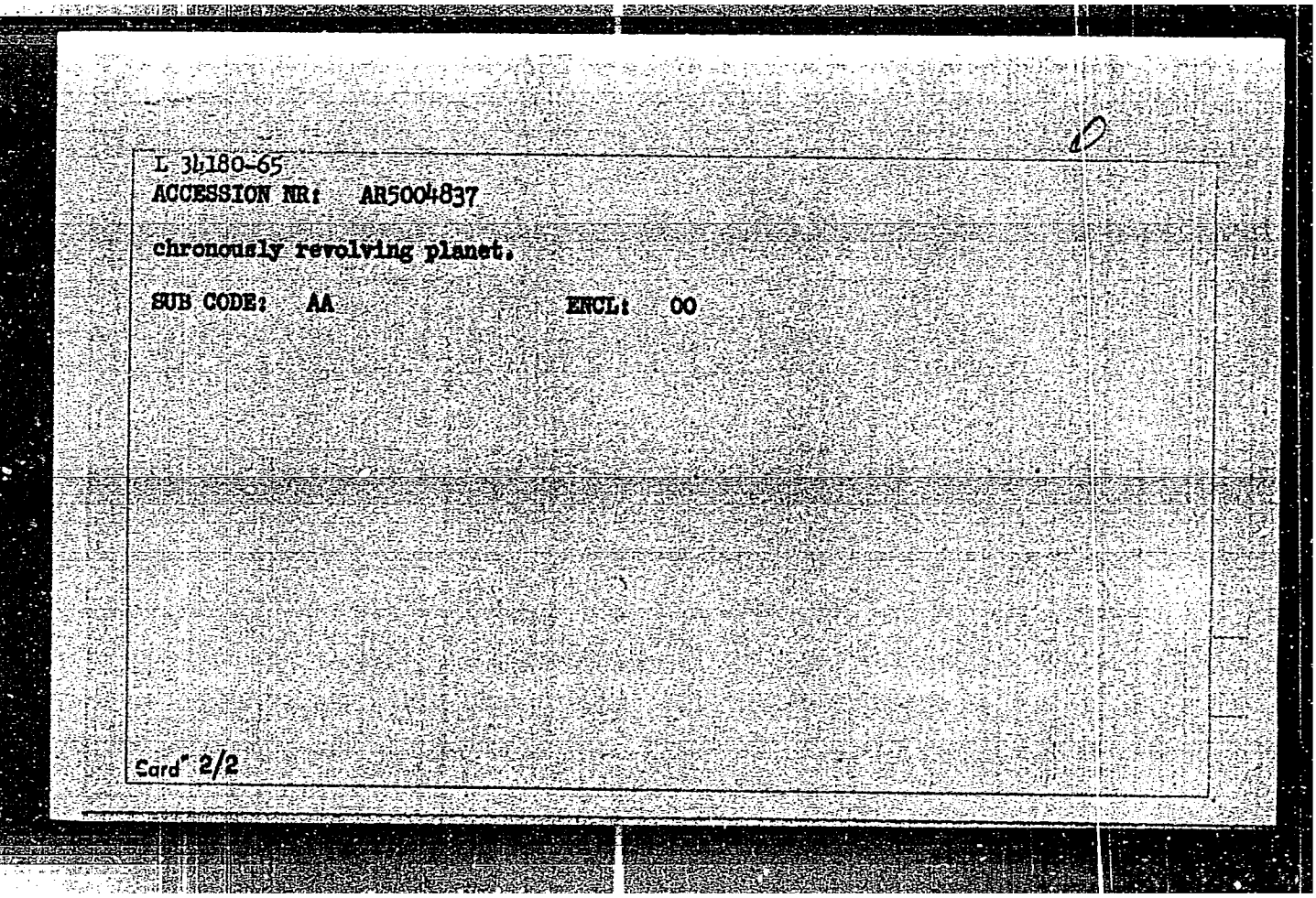
TITLE: Carbon dioxide in the atmosphere of Mercury

CITED SOURCE: Astron. tsirkulyar, no. 270, noyabrya 20, 1963, 1-4

TOPIC TAGS: planet, planetary atmosphere, Mercury planet, carbon dioxide, infrared spectrum

TRANSLATION: A report is presented of preliminary identification of the 1.6 μ CO_2 bands in the Mercury spectrum. The observations were carried out with the aid of a diffraction spectrometer with dry-ice-cooled lead-sulfite photoresistance and a 125-cm reflector. An attempt is made to calculate a model consisting of CO_2 for the Mercury atmosphere. In order for such an atmosphere not to be destroyed through dissipation of O and CO (the dissipation products of CO_2), the temperature at the critical level must be less than 1000K. A mechanism is indicated whereby a negative temperature gradient can be maintained in the thermosphere of a syn-

Card 1/2



L 31180-65
ACCESSION NR: AR5004837

chronously revolving planet.

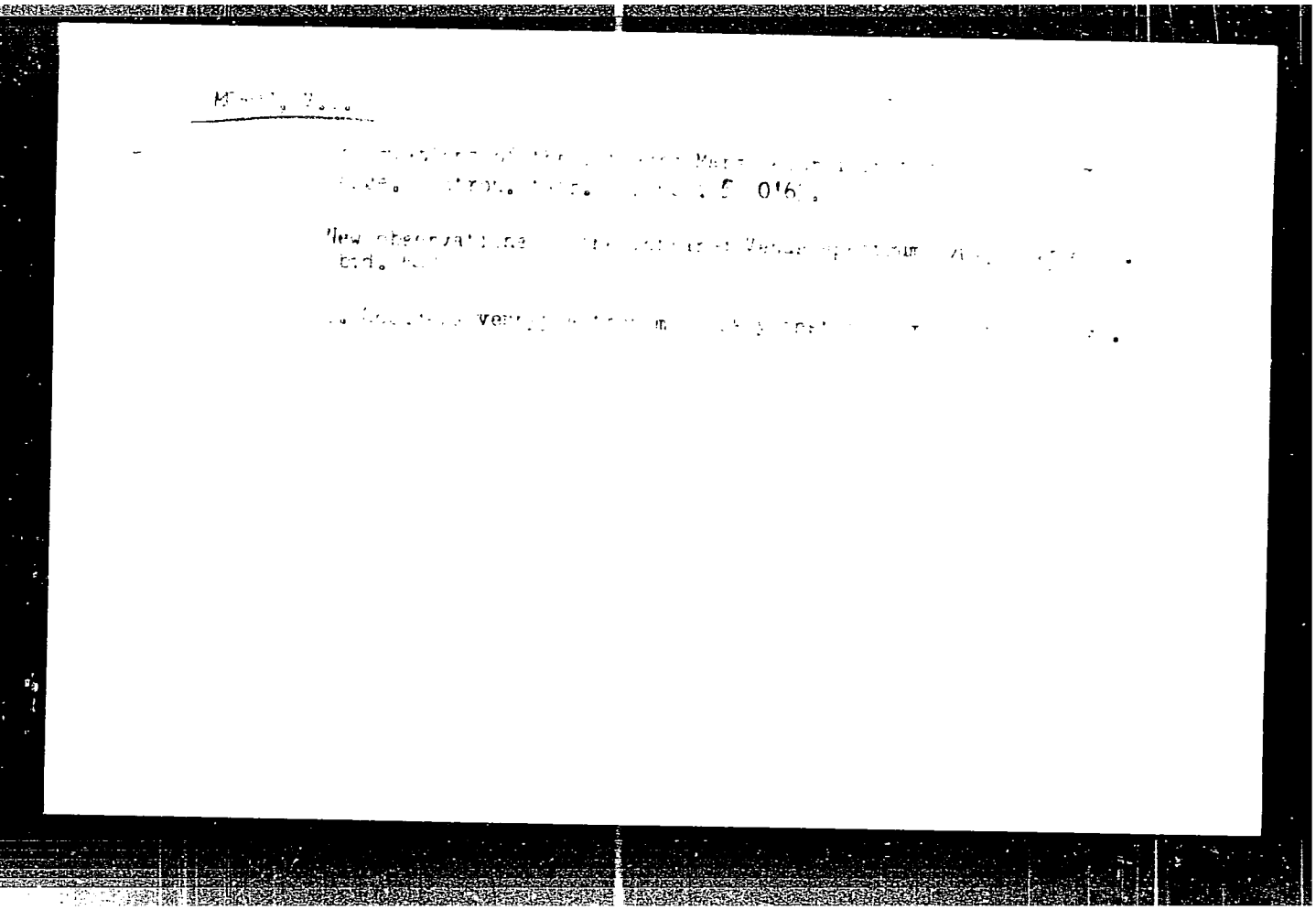
SUB CODE: AA ENCL: 00

Card 2/2

YESIPOV, V.F.; MOROZ, V.I.

Spectrophotometry of [illegible] and Mars in the [illegible] range. Astron. zhur. [illegible]

1. Gosudarstvennyy astronomicheskiy institut imeni Shternberga.



MOROZ, V. I. (Dr.)

"Recent observations of infrared spectra of planets. Venus ... Mars ... microns, Jupiter ... microns,"

paper presented at 14th Intl Symp, Astrophysics, Liege, Belgium, ... Aug ...

Sternberg Astronomical Inst.

MOROZ, V.I.

Emission of Orion nebula in the 0.85-1.7μ wavelength range.
Astron. zhur. 40 no.5:788-794 S-O '63. (MIRA 16:11)

1. Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga.

MOROZ, V.I.

Infrared observations of the Crab nebula. Astron.zhur. 40 no.6: 982-993 N-D '63. (MIRA 16:12)

1. Gosudarstvennyy astronomicheskiy institut im. P.K.Shternberga.

MOROZ, V.I.

Carbon dioxide in the atmosphere of Mercury. Astron.tsir. 270: 1-4 N '63. (MIRA 17:4)

1. Gosudarstvennyy astronomicheskiy institut imeni P.K.Shternberga.

DIVARI, N.B.; KRYLOVA, S.N.; MOROZ, V.I.

Polarization measurements of zodiacal light. Geomag. i aer. 4 no.5: 881-885 S-O '64. (MIRA 17:11)

1. Odesskiy politekhnicheskiy institut.

ACCESSION NR: AP4032728 S/0033/64/041/002/0350/0361

AUTHOR: Moroz, V. I.

TITLE: The infrared spectrum of Mars at wavelengths of 1.1-4.1 microns

SOURCE: Astronomicheskiy zhurnal, v. 41, no. 2, 1964, 350-361

TOPIC TAGS: astronomy, Mars, planetary astronomy, Martian spectrum, planetary infrared spectrum, planetary carbon dioxide, planetary absorption band, astronomical spectrophotometer

ABSTRACT: Observations of the infrared spectrum of Mars in the wavelength intervals 1.1-2.5 and 2.9-4.1 microns have been made at the Yuzhnaya stantsiya GAISh (Southern Station of the Shternberg Astronomical Institute). A 125-cm reflector and two spectrophotometers (diffraction and prism) with cooled lead sulfide photoresistors were used. The spectrum of the entire disc was obtained with a resolution of about 400 and the polar cap spectrum was obtained with a resolution of about 10, both in the 1.1-2.5 micron region. In this range the author obtained records of 12 planetary CO_2 absorption bands, 7 of which had not been detected earlier in the Martian spectrum. The intensity of the CO_2 absorption bands at 1.6μ is lower than assumed previously. The relative concentration of CO_2, computed from the new observational data, is $40/p^2$ (p is in millibars). The pressure

Card 1/2

ACCESSION NR: AP4032728

at the planet's surface is evidently much lower than 100 millibars. The presence of ice absorption bands in the polar cap spectrum is confirmed. Four unidentified absorption bands: 3.43, 3.53, 3.59 and 3.69 microns were detected in the 2.9-4.1 micron region. Three of these, according to their position, correspond to Sinton's bands (3.45, 3.58 and 3.69 microns) which the latter identifies with organic molecules. It is shown that the actual identification of Sinton's bands is in fact ambiguous and complex. The dependence between the geometric albedo and wavelength is obtained in the first approximation in the 0.4-4 micron region. This dependence is in satisfactory agreement with the reflection spectra of limonites. Orig. art. has: 2 formulas, 8 figures and 5 tables.

ASSOCIATION: Gosudarstvenny*y astronomicheskiy institut im. P. K. Shternberga (State Astronomical Institute)

SUBMITTED: 21Sep63 DATE ACQ: 11May64 ENCL: 00

SUB CODE: AA NO REF SOV: 003 OTHER: 029

Card 2/2

L 8868-65 EWT(l)/EWG(v)/EEC(t) Pe-5/Pae-2 AFWL/ESD(t)/AFMD(t)/SSD/ASD(a)-5/
AEDC(a)/AFETR: GW
ACCESSION NR: AP4043157 S/0033/64/041/004/0711/0719

AUTHOR: Moros, V. I.

TITLE: New observations of the Venusian infrared spectrum (λ 1.2 to 3.8μ)

SOURCE: Astronomicheskiy zhurnal, v. 41, no. 4, 1964, 711-719

TOPIC TAGS: infrared Venusian spectrum, planetary spectrum, solar spectrum, telluric absorption line, absorption band, gas pressure, albedo, humidity

ABSTRACT: Spectrograms of the wavelength ranges 1.2–1.8 μ, 1.9–2.5 μ, and 2.8–3.8 μ with various resolving powers of the infrared Venusian spectrum were obtained in 1963 at the Southern Station of the State Astronomical Institute im. P. K. Shternberg. The planetary spectrum was compared with the solar spectrum to eliminate telluric absorption lines. All planetary bands of the Venusian spectrum coincided with CO_2 bands obtained in laboratory experiments and were identified with the multiplets $C^{12}O_2^{16}$, $C^{12}O^{16}O^{18}$, $C^{13}O_2^{16}$, and $C^{13}O^{16}O^{18}$. The isotopic bands C^{13} and O^{18} are equal for Venus and the Earth. The temperature of the band regions is less than 300K. A table of planetary absorption bands

Card 1/2

L 8868-65

ACCESSION NR: AP4043917

in the Venusian infrared spectrum is given. The quantity of CO_2 in a unit column and the pressure of the gas were determined from the bands at 1.575 and 1.606 μ. The pressure of this gas was 0.3 atm. The radius of light scattering particles in the Venusian upper atmosphere was determined from the dependence of albedo upon the wavelength to be about 1 μ. Repeated observations of Venus under good humidity conditions in the terrestrial atmosphere made it possible to determine the quantity of CO resulting from dissociation of CO_2 in the Venusian atmosphere as $1.5 \cdot 10^{19}$ molecules of CO in a vertical unit column, which fits in with 0.5 cm atm. The same quantity of O_2 may exist in the Venusian atmosphere. The diffusion and mixing of these gases make it impossible to detect oxygen by spectroscopic measurements. Orig. art. has: 8 figures, 2 tables, and 5 formulas.

ASSOCIATION: Gosudarstvennyy astronomicheskiy institut im. P. K. Shternberga (State Astronomical Institute)

SUBMITTED: 21Sep63 ATD PRESS: 3105 ENCL: 00

SUB CODE: AA NO REF SOV: 007 OTHER: 017

Card 2/2

L 18400-65 EWG(v)/EWT(1)/EEC(t)/ Pe-5/Pae-2/ AFWL/APGC(b)/SSD(c)/SSD/BSD/ESD(gs)/
ACCESSION NR: AP5001233 ESD(t) GW 8/0033/64/041/006/1108/1117

AUTHOR: Moroz, V. I.

TITLE: The infrared spectrum of Mercury (λ 1.0—3.9μ)

SOURCE: Astronomicheskiy zhurnal, v. 41, no. 6, 1964, 1108-1117

TOPIC TAGS: planetary atmosphere, Mercury atmosphere, infrared spectroscopy, Mercury atmosphere model

ABSTRACT: The infrared spectrum of Mercury in the wavelength region 1.0—3.9 μ was recorded in October 1963 when the planet was close to perihelion, near the position of maximum elongation. Observations were conducted at the Southern Station of the Shternberg State Astronomical Institute by means of the 125-cm reflector and two spectrometers with a lead-sulphide photocell cooled by solid carbon dioxide and liquid nitrogen. Mercury's stellar magnitude ranged from $+0^m1$ to -0^m8, and its temperature was close to the maximum. It was found that the CO_2 absorption bands were somewhat stronger than the telluric bands. A model for the atmosphere of Mercury was computed on the assumption that it consists of 10% CO_2 and 90% N_2. The total amount of CO_2 on

Card 1/3

L 18400-65
ACCESSION NR: AP5001233

Mercury is estimated at 0.3—7 g/cm^2. Though it was not expected that diatomic and triatomic molecules could be detected since such molecules would have been dissociated by ultraviolet solar radiation and their components rapidly dissipated, an attempt was, nevertheless, made to compare the intensity of CO_2 absorption bands near 1.6 μ in the spectra of Mercury and of the Moon. It was found that they are stronger in the spectrum of Mercury. In spite of the large radiative flux, the temperature at the critical level can be low due to the flow of heat from the illuminated to the dark hemisphere. The concentration of molecules on the surface of Mercury is the same as on the Earth at an altitude of 50 km, but it decreases more slowly with altitude and, consequently, the overall extension of the atmosphere is much greater. The relative distribution of spectral energy is graphically presented and the color and brightness temperatures are estimated. Orig. art. has: 9 figures, 3 formulas and 2 tables.

ASSOCIATION: Gosudarstvennyy astronomicheskiy institut im. P. K. Shternberga (State Astronomical Institute)

Card 2/3

L 18400-65

ACCESSION NR: AP5001233

SUBMITTED: 12Dec63 ENCL: 00 SUB CODE: AA

NO REF SOV: 005 OTHER: 010 ATD PRESS: 3154

Card 3/3

ACCESSION NR: AP4012550 S/0056/64/046/001/0232/0242

AUTHORS: Vishnevskiy, V. F.; Tu, Yuan-ts'ai; Moroz, V. I.; Nikitin, A. V.; Troyan, Yu. A.; Chiang, Shao-chun; Chang, Wen-yu; Shakhbazyan, B. A.; Yen, Wu-kuang

TITLE: Possible scheme of production of Λ hyperons via isobars in negative pion -- proton interactions at 7--8 BeV energy

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 232-242

TOPIC TAGS: LAMBDA hyperon production, negative pion proton interaction, baryon isobar, meson isobar, baryon isobar decay, meson isobar decay, strange particle production, two particle reaction

ABSTRACT: In view of the failure of the statistical model to explain the two peaks in the momentum distribution of the Λ hyperons produced by negative pions with 7--8 BeV energy observed in Dubna (V. I. Veksler, I. Vrana, Ye. N. Kladnitskaya et al., Preprint, OIYaI, D-806,

Card 1/3

ACCESSION NR: AP4012550

1961; V. A. Belyakov, Wang Yung-tsang, V. I. Veksler et al., ZhETF, v. 44, 431, 1963) an attempt is made to analyze these data on the basis of a kinematic approach that follows from the assumption that the hyperons are produced in two-particle reactions of the type $\pi^- + p \rightarrow A + B$, where A can be a Λ hyperon or one of the known baryon isobars, and B can be a meson or one of the known meson isobars. This includes, in particular, the case $N_3^* \rightarrow \Lambda + K$, which is described in detail and discussed by the authors elsewhere (preprint, OIYaI R-1282, 1963). The kinematic analysis of the Λ hyperon is made under the assumption that the transverse momentum of the isobars produced in the $\pi^- p$ interactions is small. The choice of A and B, together with their decay, is determined by the conservation laws. It is shown that of all the possible reactions of the indicated type, the most probable ones are those where the Λ hyperons are produced directly in $\pi^- p$ interaction or via the isobars Y_1^* (1385), N_3^* (1688), N_4^* (1922), and Y_0^* (1815). The relative probabilities of the corresponding Λ-hyperon production channels are estimated. The results of the analysis are in agreement with the experimental data, which

Card 2/3

ACCESSION NR: AP4012550

offer some evidence that the π^-p interactions with strange-particle production is, with noticeable probability, a two-particle reaction whose products can be isobars. "The authors take the opportunity to thank V. I. Veksler for interest and support, to the propane-chamber crew of the OIYaI high-energy laboratory, to V. S. Bareshenkov, D. A. Blokhintser, G. Domokosh, I. Pater and the Chinese physicists working at the Joint Institute for useful discussions, and also V. P. Solomakhina, V. M. Ponomareva, and M. I. Chikvareva for help with the data reduction."

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 21May63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 006

Card 3/3